

CLAIMS

What is claimed is:

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1. A nonwoven composite structure comprising: a plurality of layers of nonwoven fiber material wherein said layers of nonwoven fiber material comprise a plurality of fiber elements, said layers of nonwoven fiber material being bonded together by an adhesive extending substantially between said layers of nonwoven fiber material, said layers of nonwoven fiber material being further bonded together by the forced extension of fiber elements from one or more of said layers of nonwoven fiber material substantially across said adhesive such that mechanical entanglement is established between adjacent layers of said nonwoven fiber material.
2. The invention according to claim 1, wherein said nonwoven composite structure is characterized by a thickness of not less than about 6.35 mm.
3. The invention according to claim 1, wherein said nonwoven composite structure is characterized by a density in the range of about 0.1 to about 0.55 grams per cubic centimeter.
4. The invention according to claim 1, wherein said nonwoven composite structure is characterized by a thickness of not less than about 6.35 mm and a density in the range of about 0.20 to about 0.55 grams per cubic centimeter.
5. The invention according to claim 1, further comprising a layer of material selected from the group consisting of woven textile material, knit textile material, stitched textile material and thermal bonded textile material incorporated within said nonwoven composite structure.

6. The invention according to claim 1, wherein said nonwoven composite structure comprises not fewer than three layers of nonwoven fiber material and not fewer than two layers of adhesive extending between said layers of nonwoven fiber material.
7. The invention according to claim 6, wherein at least two of said layers of adhesive are of differing chemical composition from one another.
8. The invention according to claim 1, wherein said adhesive comprises a dry adhesive.
9. The invention according to claim 8, wherein said adhesive is activated by a method selected from the group consisting of, heat application, chemical activation, radio frequency radiation, hot gas and ultrasonic energy.
10. The invention according to claim 8, wherein said adhesive is activated in a selected geometric pattern such that a discontinuous bond is formed between said layers of nonwoven fiber material.
11. The invention according to claim 8, wherein said adhesive comprises a meltable scrim fabric.
12. The invention according to claim 8, wherein said adhesive comprises a meltable polyamide adhesive.
13. The invention according to claim 1, wherein the fiber elements forming said layers of nonwoven fiber material are characterized by a linear density in the range of about 2 denier to about 15 denier with a length of about 50 mm to about 105 mm and are selected from the group consisting of,

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acrylic fibers, acetate fibers, wool fibers, and rayon fibers and blends thereof.

4. The invention according to claim 1 wherein the nonwoven fiber material is of differing characteristics of nonwoven fiber material such that said material is homogeneous.

15. A nonwoven fabric comprising a plurality of layers of nonwoven fiber material, each layer comprising a plurality of intermingled staple fibers, the layers being bonded together by one or more layers of substantially sandwiching relative material, the nonwoven composite having a thickness of less than about 6.3 mm and being formed from a material having about 0.1 grams per cubic centimeter.

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ers, acrylic fibers, acetate fibers, rayon fibers and blends thereof by a linear density in the range of 1 to 10 tex and an average length in the range of about 10 to 30 microns.

invention according to claim 15 comprise a dry adhesive.

18. The invention according to claim 15, wherein said one or more layers of adhesive comprise a dry adhesive.

19. The invention according to claim 18, wherein said dry adhesive comprises a meltable scrim fabric.

20. The invention according to claim 18, wherein said one or more layers of adhesive is activated in a selected geometric pattern such that a discontinuous bonding pattern is formed between adjacent layers of nonwoven fiber material.

21. The invention according to claim 18, wherein said one or more layers of adhesive comprises a scrim fabric of spun bonded construction.

22. A method for forming a nonwoven composite structure comprising the steps of:

- (a) forming a plurality of individual layers of nonwoven fiber material by needle punching a plurality of fiber elements;
- (b) placing layers of adhesive between the layers of nonwoven fiber material; and
- (c) activating said layers of adhesive thereby bonding said individual layers of nonwoven fiber material together in a laminate structure such that an adhesive layer extends between said individual layers of nonwoven fiber material.

23. The invention according to claim 22, wherein prior to the activating step, a portion of the fiber elements forming one or more of said layers of nonwoven fiber material are forced through one or more of said layers of adhesive.

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